DESERT LANDSCAPE CONSERVATION COOPERATIVE

IDENTIFYING SCIENCE NEEDS FOR 2012

In November 2010, an ad-hoc Science Sub-Committee for the Desert LCC completed a rapid assessment of science needs that provided an initial step towards understanding information needs shared across the Desert LCC. This assessment resulted in the collation of 115 science needs that were drawn from documents and outreach meetings. This rapid assessment was useful because it allowed the Desert LCC to identify collaborative partnerships, laid the foundation for a more thorough comprehensive science needs assessment, and informed the process for funding applied science projects within the Desert LCC region in 2011.

In September 2011, the Steering Committee approved membership for the Science Working Group and identified 26 priority 2012 priority science needs within 8 thematic areas of focus identified from the rapid assessment. The 8 themes were identified as:

- water
- ecosystems
- wildlife and plant populations
- habitat
- soils
- human environment
- cultural resources, and
- threats.

The Science Working Group, using those same themes as a framework, began conducting a comprehensive science needs assessment that will help guide the Desert LCC's science priorities for the next few years. During a meeting in February 2012, the Science Working Group developed 23 priority science needs from over 550 science needs indentified through extensive literature review and outreach. Additionally, Desert LCC coordinators solicited science projects from stakeholders that met the 2012 priorities. We received 64 projects from 13 different agencies.

In April 2012, Steering Committee members reviewed the 2012 Science Needs. At this meeting, the Steering Committee also acknowledged the importance of baseline data and capacity needs for the Desert LCC. Projects submitted fit well with priority science needs and allow Desert LCC partners to identify collaborative opportunities and provide critical information regarding the application of an identified need.

PRIORITY SCIENCE NEEDS AND PROJECT TYPES IN FY2012

Water

Science Need: Immediate and future availability, variability, and distribution of water

Evaluate immediate and future availability, variability, and distribution of water for US

Fish and Wildlife Service Refuges in Sonora and Chihuahua desert.

Science Need: Correlation between climate/land use induced changes and stream flows and aquatic habitat maintenance

Evaluate alternative forest restoration treatments in terms of effects on water and other natural resources in comparison to no treatment as well as stand-replacing wildfire. Develop a methodology for monitoring and modeling restoration treatments and post-wildfire of uplands adjacent to the deserts of the LCC.

Science Need: Increased understanding of surface-ground water interactions

Conduct a basin wide study of San Juan Basin, including surface and subsurface water contributors to determine effects to the underlying aquifers. Determine locations, volumes, areas of occupation, time frames of abundance, interaction with other resources, current and historic conditions, and inflow and outflow dynamics.

Ecosystems

Science Need: Resiliency/vulnerability

Evaluate the effects of the different border wall designs between Mexico and the US in wild species populations of flora and fauna and their habitat.

Science Need: Disturbance-induced changes to ecosystems (e.g., climate, grazing, fire, invasive species)

Improve understanding of the impacts and control of invasive species on Southwestern ecosystems.

Science Need: Predicted shifts in ecosystem composition and distribution due to climate change

Detect climate change impacts on birds and their habitats in the Desert LCC region by developing a coordinated foundation for monitoring environmental change in the Sonoran Joint Venture region and elsewhere in Mexico.

Wildlife and Plant Populations

Science Need: Plant and animal species vulnerability assessments (and especially, endemic species association with springs and seeps)

Evaluate the factors that influence occurrence (and, indirectly, sustainability) of species using aquatic and riparian habitats. Use a multivariate analysis to examine empirically-derived species occurrence data, and habitat attributes such as water flow, temp, sedimentation, vegetation parameters, and soils, as well as land use parameters.

Science Need: Inventories of plant and animal species distribution in support of vulnerability assessments

Monitor reproduction and recruitment of endangered species, particularly rare plants on the Navajo Reservation and determine threats.

Science Need: Adaptation strategies for focal plant and animals that are vulnerable to climate change

Inventory changes in plant species distribution in the Old Woman Mountains to identify plant species vulnerability and adaptation strategies.

Science Need: Connectivity

Estimate abundance and population structure of bears and cougars in the Sky Islands Region and examine the importance of, and threats to, habitat connectivity among

mountain ranges for the two species.

Habitat

Science Need: Identify priority hot spots and refuges

Gather previously published or available genetic datasets for up to 30 species across their ranges in the Mojave Desert. Compare and summarize individual species results in GIS by creating a multi-species genetic landscape, locate genetic diversity hotspots, and evaluate in current and proposed land use contexts.

Science Need: Effective techniques for restoring habitat

Determine techniques to restore subtropical grasslands that formerly occurred in more mesic portions of the Sonoran Desert.

Science Need: Predicted changes in the amount and types of riparian habitat due to climate change and land use change

Soils

Science Need: Recoverability of degraded soils

Science Need: Soil stabilization (including sand dune stabilization)

Determine the most effective type of tree shelterbelt (number, species, and placement) to reduce wind velocity and mitigate the movement of sand dunes.

Science Need: Soil condition assessment (including soil carbon in grasslands)

Identify soil types in the southwest and on Navajo Nation that are vulnerable to sand dune formation if they are not managed properly. Locate and document existing dunes and indicate potential dune areas. Suggest mitigation measures and rate the areas based on probability of increasing dune formation and movement.

Human Environment

Science Need: Effects of climate change on water availability for humans, including domestic and agriculture uses (and tribal water issues)

Incorporate gallons per capita depletions per day into global climate models to fully understand impacts to depletions.

Science Need: Climate forecasts as they pertain to agriculture

Complete agricultural demand analysis for Rio Grande Risk Assessment by using crop coefficients to determine historic and future agricultural demand.

Science Need: Effects of climate change on recreational use and tourism (including carrying capacity and communication dimensions as a component)

Cultural Resources

Science Need: Effects of major environmental changes on the socio-economic structure of Native American communities, and how human adaptations to past climate changes can help address how present communities can respond

Identify potential environmental and socio-economic impacts caused by the release of the saltcedar beetle as a biological control in the communities and villages of the Chihuahuan Desert.

Science Need: Best tribal practices for maintaining populations of desert plants/animals of cultural significance, including traditional agricultural species

Identify how management practices of indigenous Sonoran Desert communities have contributed to the conservation of managed ecosystems, particularly those already affected by climate change.

Science Need: Effects of energy development (oil, gas, wind, solar) on traditional land uses at energy sites

Determine the best practices for valuing landscapes and evaluating impacts of landscape change on sacred sites (e.g., solar, wind, water withdrawal).

Threats

Science Need: Effects of energy development on ecosystem function and species

Assess the cumulative environmental impacts to sensitive wildlife species from oil and gas development in the four corners region.

Science Need: Effects of climate change on the competitive ability and rates of spread of invasive plants

Determine if increases in invasive plant species on rangeland has a relation to drought and decreasing native vegetation species.

Science Need: Effects of groundwater development and inter basin transport on ecosystem.

Develop an understanding of the groundwater flow network that supports the Amargosa Wild and Scenic River system, taking into account sources of groundwater withdrawals that might affect current or future perennial flow.

Science Need: Contribution of land uses to overall landscape fragmentation

Integrate the most current projections of landscape change with urban development and use spatial modeling, remotely sensed imagery and other GIS data to predict habitat area, fragmentation and corridor network connectivity for a broad range of wildlife taxa. Include expected future change in vegetation and land use patterns to predict effects of these changes on habitat area, fragmentation and corridor network connectivity for a selection of wildlife taxa of greatest conservation concern.

Baseline Data and Capacity

Develop GIS data layers for the DLCC as identified from the GIS working group.

Create user-friendly database of comprehensive science needs.

Create a Desert LCC data portal and interactive mapping tool(s).

FOR FURTHER INFORMATION, CONTACT:

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